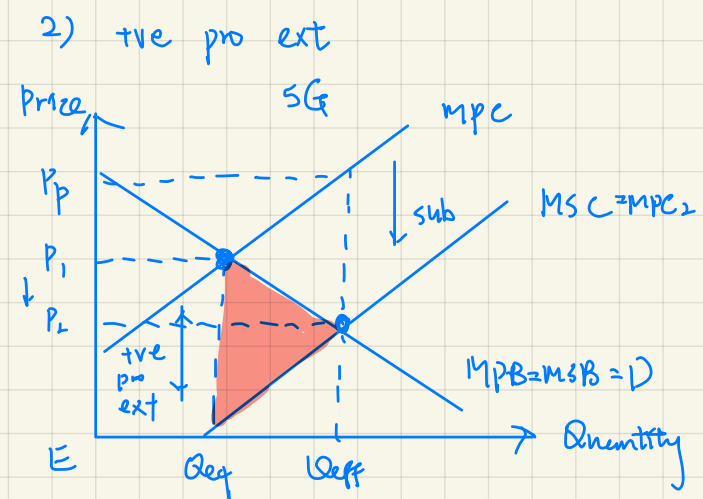


the pro ext



a) subsidy to firms

- ⇒ pro. cost ↓
- ⇒ +ve pro ext is internalised to be the benefit to the firms through ↓ in MPC
- ⇒ If sub = +ve pro ext
- ⇒ MPC shifts down to MSC
- ⇒ P_m ↓ from P_1 to P_2
- ⇒ ↑ incentive to ↑ Q_m from Q_{eq} to Q_{eff}
- ⇒ At Q_{eff} , $MSC = MSC$

b) Advantage

① ⇒ ∴ Market-based policy

- ⇒ ↓ P_m fast due to the subsidy
- ⇒ create incentive for consumers to ↑ Q_e
- ⇒ Q_m ↑ to Q_{eff}
- ⇒ Immediate impact

② C-S : P_c ↓ P_1 to P_2 , Q_c ↑ Q_e to Q_{eff}
 ⇒ Area CDP_1 to CBP_2

P.S : P_p ↑ P_1 to P_p , Q_p ↑ Q_e to Q_{eff}
 ⇒ TR ↑, Area P_1DE to P_pAE

③ ↓ income disparity

- ⇒ poor & rich face the same amount of p ↓
- ⇒ rich benefit less % in terms of their income than the poor

④ ↓ monitoring cost

- ⇒ no need gov to monitor the operation
- ⇒ save cost to spend on edu & health
- ⇒ ↑ L-S

Weakness

① Ineffective to ↑ Q_m under price inelastic D

- ⇒ subsidy, S shifts ↓
- ⇒ P_m ↓ leads to less than proportional ↑ in Q_m
- ⇒ ↑ Q_m a little
- ⇒ Not effective to ↑ Q_m

② ↑ financial burden for gov

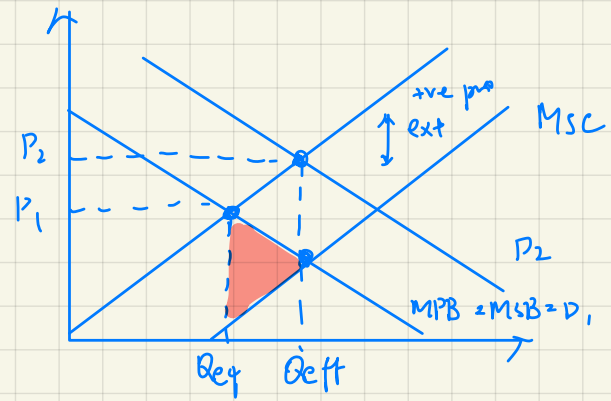
- ⇒ Expense on subsidy (Area P_pP_2AB)
- ⇒ may need to ↑ tax
- ⇒ harm the tax payers
- ⇒ give up \$ that spend on edu & health-care
- ⇒ ↓ L-S, ↑ financial burden

③ Tech difficulties in calculating sub

- ⇒ In order to effectively ↑ Q_m
- ⇒ set sub = +ve pro ext
- ⇒ +ve pro ext is subjective
- ⇒ difficult to find out the value of +ve pro ext
- ⇒ not easy to set
- ⇒ Too high : overproduction, too low : ineffective to ↑ Q_m

d) Gov regulation

⇒ e.g. gov requires many households or firms to adapt the SC



⇒ $D \uparrow$ from D_1 to D_2

⇒ $P_m \uparrow P_1$ to P_2 & $Q_m \uparrow Q_m$ to Q_{eff}

⇒ At Q_{eff} , $MSB = MSC$

⇒ No DWL, Eff, no m.f.

Advantage

① Effective to $\uparrow Q_{eq}$ to Q_{eff} even under price inelastic D

⇒ Everyone has to follow

⇒ otherwise will be punished

⇒ $D \uparrow$, $Q_{eq} \uparrow$

⇒ not $\uparrow P$ to $\downarrow Q_m$

⇒ Effective to $\uparrow Q_m$ even under price inelastic D

② No tech difficulties

⇒ No need to calculate subsidy

⇒ save time & \$

⇒ \uparrow effectiveness to $\uparrow Q_m$

③ \downarrow financial burden compared with subsidy

⇒ no need to subsidise the firms

⇒ save the \$ for edu, healthcare

⇒ $\uparrow L-S$

Weakness

① Time-consuming under political constraints & administrative process

⇒ gov sets the regulation

⇒ hv to go through long process

⇒ need to consider various stakeholders

⇒ Time consuming to $\uparrow Q_m$

② \uparrow monitoring cost

⇒ Recruit someone to monitor the situation see if they follow

⇒ expense

⇒ give up \$ on edu & health care

⇒ $\downarrow L-S$

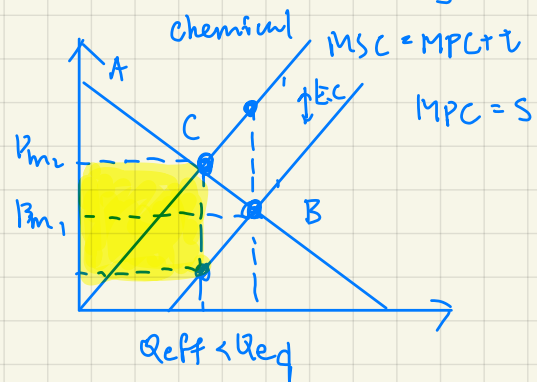
③ \uparrow income disparity

⇒ Rich & poor face the same $p \uparrow$

Negative production externality

a) Market-based policies

① Indirect tax or Pigorian tax



- ⇒ $Q_{eq} > Q_{eff}$: over-pro
- ⇒ DWL : Allocative inefficiency
- ⇒ Indirect tax: tax on spending of goods & services
- ⇒ Impose indirect tax = $\$t = E.C$
- ⇒ Production cost ↑ by $\$t = E.C$
- ⇒ E.C is internalised to be the private cost
- ⇒ to the firms through tax
- ⇒ $MPC \uparrow$ by $\$t$ to MSC
- ⇒ $P_m \uparrow$ from P_m to P_{m2}
- ⇒ $Q_m \downarrow$ from Q_e to Q_{eff}

- ⇒ At new $Q_m = Q_{eff}$, $MSB = MSC$
- ⇒ No DWL, M.F., efficiency

ai)

⇒ strengths

① ↑ gov revenue

- ⇒ ↓ gov financial burden
- ⇒ $\$$ to do edu & promotion to ↓ consumption of goods creating -ve pro ext
- ⇒ $D_{gd} \downarrow$ further ⇒ $Q_{eq} \downarrow$ even close to Q_{eff}
- ⇒ More effective to ↓ m.f. in a longer time

② Immediate impacts without much administrative system v.s gov regulation

⇒ ∴ Market-based policy

⇒ Tax ✓ ⇒ $P_m \uparrow$ fast

⇒ Consumer respond to the signal sent out by ↑ Ps

⇒ $Q_m \downarrow$ or $Q_d \downarrow$ without political concentration & time consuming administrative process in gov regulation

⇒ fast to ↓ M.F

③ ↓ monitoring cost to check by the gov

⇒ It is not gov regulation

⇒ We don't need to monitor whether the producers follow the requirement

⇒ Save monitoring cost.

aii)

⇒ Weakness:

① It is ineffective to ↓ Q_m under price inelastic D

⇒ E.C is internalised to be the MPC by the tax

⇒ $P_{m,gd} \uparrow$, leads to less than proportional ↓ in Q_m

⇒ $Q_m \downarrow$ little

⇒ Ineffective to ↓ Q_m close to Q_{eff}

Tax is, very insignificant to firms

⇒ After paying tax, continue to produce w/o cutting Q_m

② Technical difficulties to calculate the tax

⇒ time consuming to calculate & ↑ Q_m

⇒ Aim: tax = -ve pro ext ⇒ $Q_m \rightarrow Q_{eff}$

⇒ -ve pro ext is subjective to diff ppl

⇒ Diff to quantify & identify who suffer -ve pro ext

③ ⇒ $P_m \uparrow$ from P_{m1} to P_{m2}

⇒ consumer suffer on $P_m \uparrow$ & $Q_m \downarrow$

⇒ C.S ↓ from ABP_{m1} to ACP_{m2}

④ ⇒ Rich & Poor suffer same ↑

⇒ $P \uparrow$ is counted as lower % of the income of the rich than the poor

⇒ Income ↑, tax rate ↓ : Regressive tax

⇒ Income disparity ↑ ⇒ social stability

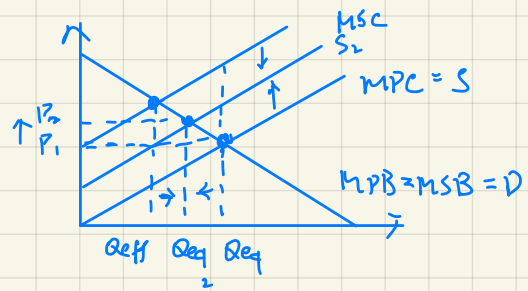
⑤ ⇒ $P_p \downarrow$ ⇒ $Q_m \downarrow$

⇒ TR producers ↓ ⇒ R.S ↓

⇒ Producers suffer ⇒ D.workers ↓

⇒ W & E ↓

b) Carbon tax: Tax on carbon emissions (e.g. Norway, Australia)



- ⇒ Carbon tax is imposed
- ⇒ E.C or -ve pro ext is internalised via tax, $MPC \uparrow$
- ⇒ MPC shift upward
- ⇒ ↑ incentive for the firms to adopt environmentally friendly production method to skip tax
- ⇒ E.C ↓ ⇒ MSC shifts downward to $MSC = MPC$
- ⇒ $Q_{eff} \uparrow$, $P_m \uparrow$ ⇒ $Q_{eq} \downarrow$ to $Q_{eq_2} = Q_{eff_2}$
- ⇒ No DWL, Eff, No M.F

Strength:

① Indirect tax 1st strength

② Indirect tax 2nd strength

- ③ ⇒ ↑ Incentive for firms to adopt environmentally friendly method
- ⇒ ↑ sustainability of society
- ⇒ ↓ pollution
- ⇒ ↓ E.C in a sustainable way & long run
- ⇒ Effective to ↓ M.F

① May be ineffective to ↓ Q_m to Q_{eff} under price inelastic D

⇒ carbon tax ⇒ MPC shifts up

⇒ $P_m \uparrow$ ⇒ ∴ price inelastic D ⇒ $P \uparrow$ leads to less than proportional ↓ in Q_m to Q_{eff}

⇒ worry that firms with high returned profit can pay the tax & keep on producing

② Time consuming & difficult to calculate the carbon tax

⇒ ↑ time lag for $Q_m \downarrow$ to Q_{eff}

⇒ which product emit carbon?

⇒ -ve pro ext to diff people are subjective

⇒ difficult to quantify the value of the pro-ext

⇒ Not easy to set tax per carbon emitted

① May be ineffective to ↓ Q_m to Q_{eff} under price inelastic D

⇒ carbon tax ⇒ MPC shifts up

⇒ $P_m \uparrow$ ⇒ ∴ price inelastic D ⇒ $P \uparrow$ leads to less than proportional ↓ in Q_m to Q_{eff}

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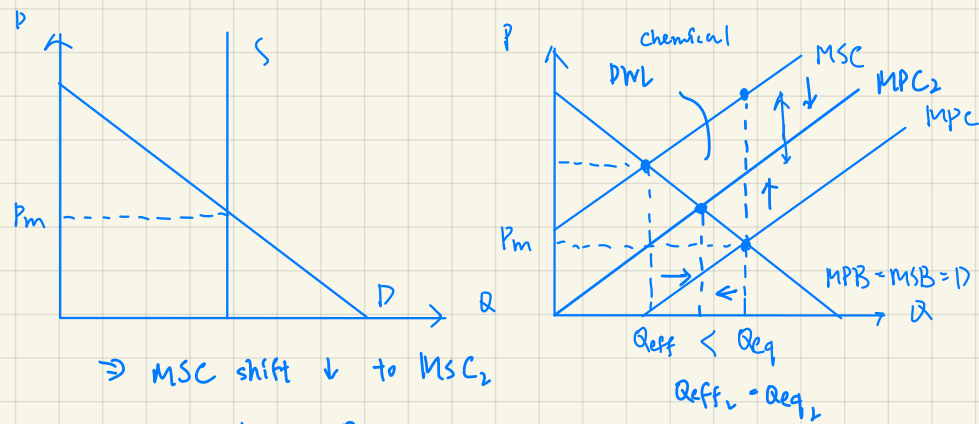
⇒ -ve pro ext to diff people are subjective

⇒ difficult to quantify the value of the pro-ext

⇒ Not easy to set tax per carbon emitted

1c7 Tradeable permit

- ⇒ Permit purchased in the market for allowing pollution for specific amount
- ⇒ 1st: gov allocate to the firms (mostly free of charge)
- ⇒ 2nd: firms can sell permits in the market if they have more
- ⇒ 3rd: form a market for permits to be exchanged



- ⇒ MSC shift \downarrow to MSC_2
- ⇒ $Q_{eff} \uparrow$ to Q_{eq_2}
- ⇒ No DWL
- ⇒ Allocative eff

⇒ If the firms produce, they need to buy permits

- ⇒ pro-cost \uparrow
- ⇒ E.C is internalised as the MPC through price of permit
- ⇒ MPC shift up, $P_m \uparrow \Rightarrow Q_{eq} \downarrow$ to Q_{eq_2}
- ⇒ \uparrow incentive for firms to adopt or develop env friendly method
- ⇒ E.C \downarrow

Weakness

- Time consuming & difficult to set the amount of permit & hard to decide who get the permit

consider: a) Fairness

b) -pro-ext is subjective

⇒ Difficult to quantify

c) Too many permit: Ineffective to $\downarrow Q_m$

Too few permit: unrealistic

② Ineffective to $\downarrow Q_m$ under price inelastic D

③ consumer suffer

④ producer suffer

⑤ \uparrow income disparity

Strengths

- Firms are encouraged to adopt env friendly method in production

⇒ \downarrow E.C or pollution to large extent & for long time

⇒ \therefore Firms want to skip the payment for the permit & sell the permit for another profit

⇒ Develop green pro- method

- Market-based: All parties respond quickly according to the market price

⇒ For buying & selling permit

⇒ \uparrow pro-cost, $P_m \uparrow$ & $Q_m \downarrow$ with fast response

⇒ quickly $\downarrow Q_m$

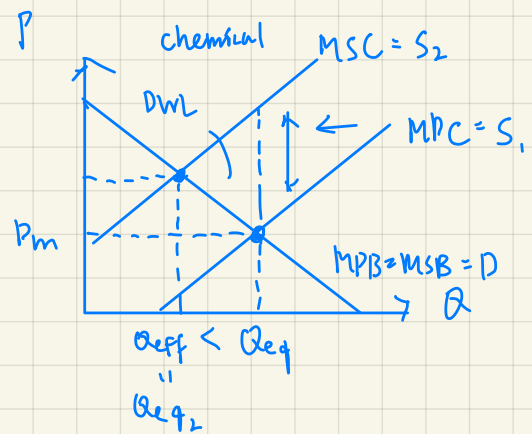
2) gov regulations or rules

⇒ Regulation or rules set by the government on the consumption or production of the market Q_m

⇒ e.g. ⇒ ↓ production to Q_{eff}

⇒ can only use env. friendly prod. method

⇒ cannot buy cigarette if under 18



⇒ e.g. Restriction on production of chemical to ↓ S of the prod. until Q_m to Q_{eff}

⇒ S ↓ or shifts to the left to S_2

⇒ Q_m ↓ to Q_{eff}

⇒ No DWL

⇒ At Q_{eff} , $MSB = MSC$

⇒ Efficiency

Strengths

① Effective to ↓ Q_m even under price inelastic D

⇒ gov control ⇒ compulsory actions for firms to ↓ Q until Q_{eff}

⇒ if not, firms are punished

⇒ regardless of PED

② No tech difficulties to calculate the tax or permit, instead it is not time consuming to determine how output should be restricted

⇒ easily can check for Q_{eff}

⇒ Then just order firms to ↓ S

Weakness

① Time consuming on monitoring & policing the policy

⇒ ∴ Regulation, ensure firms are following

⇒ ↑ cost in monitoring & time

② No gov tax revenue ↑ to ↑ edu, promotion

⇒ so that cannot ↓ D

⇒ Q_m ↓ to Q_{eff}

③ Political constraints

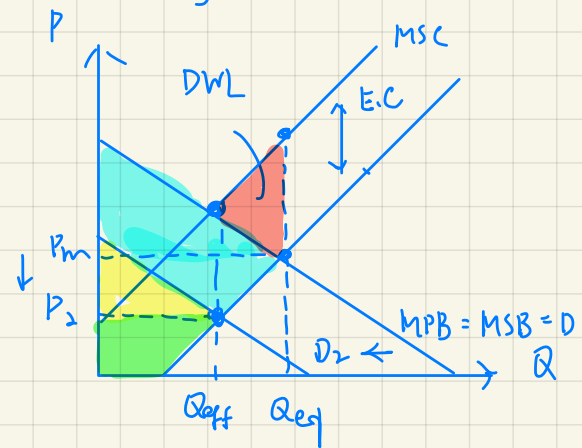
⇒ set policy, need to go through complicated administrations

(∴ involve the right of various stakeholders)

⇒ time consuming

⇒ ↓ Q_m

Advertising, Education, promotion



- ⇒ not using chemical
- ⇒ ↓ consumption of chemical
- ⇒ $D \downarrow$ from D_1 to D_2
- ⇒ $P_m \downarrow$ & $Q_{eq} \downarrow$ to $Q_{eff} = Q_{eq_2}$

Strength

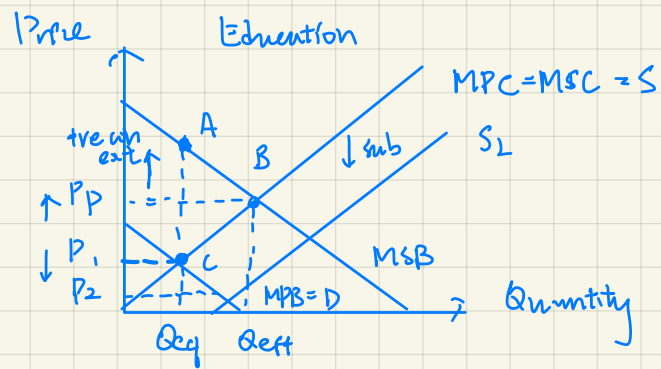
- ① No tech difficulties
 - ⇒ No need to calculate E.C. to set tax, permit
 - ⇒ ↓ time & cost
 - ⇒ ↑ Effectiveness of ↓ Q_{eq}
- ② Effective in ↓ Q_m regardless of PED
 - ⇒ ∵ $D \downarrow$; not ↑ P to ↓ Q_{eq}
 - ⇒ Effective to ↓ Q_{eq} even under price inelastic D
- ③ ↓ Income disparity
 - ⇒ rich & poor pay the same amount of price reduction
 - ⇒ P reduction contribute higher percentage of income for the poor than the rich
 - ⇒ Rich benefit less % than the poor

Weakness

- ① Not immediate input
 - ⇒ prepare of consumer may be low
 - ⇒ need time to reach people & let them digest
 - ⇒ The effect may be lagged behind
- ② X Tax revenue, instead, there is ↑ gov exp
 - ⇒ ↑ financial burden of the gov
 - ⇒ gov may ↑ tax for household or firms
 - ⇒ disposable income of household & profit of firms ↓
 - ⇒ L.S ↓

Positive consumption
externality

Education



- ⇒ under-consumption, $Q_e < Q_{eff}$ ($MSB > MSC$)
- ⇒ DWL ⇒ ineff ⇒ mif
- ⇒ Market based: production subsidies
- ⇒ subsidy ⇒ ↓ pro cost
- ⇒ $MPC \downarrow \Rightarrow S$ shift down
- ⇒ $P_m \text{ edu} \downarrow$ from P_1 to P_2
- ⇒ the tve con ext is internalised to consumers by ↓ P_{eq} .
- ⇒ ↑ Q_{eq} from Q_{eq} to Q_{eff}
- ⇒ At Q_{eff} , $MSB = MSC$
- ⇒ No DWL
- ⇒ Allocative efficiency

Strengths

- ① Immediate impact
 - ⇒ ∴ Market-based
 - ⇒ subsidy
 - ⇒ $P_m \downarrow$ immediately
 - ⇒ incentive is quick to be given to the consumers
 - ⇒ $Q_m \uparrow$ effectively
- ② No political constraints
 - ⇒ not like gov regulation
 - ⇒ don't need to go through a long process of administration
 - ⇒ don't need to consider various stakeholders much
 - ⇒ Fast & effective

③ Consumers benefit

- ⇒ P_c paid by consumers ↓ & $Q_m \uparrow$
- ⇒ C-S ↑ from Area ABP_{eq} to ACP_{eff}
- ⇒ ↑ purchasing power & L-S

④ Producers benefit:

- ⇒ $P_p \uparrow$ from $P_{eq} \times Q_{eq}$ to $P_p \times Q_{eff}$
- ⇒ ↑ PS from $P_{eq}BO$ to P_pDO
- ⇒ With more returned profit, better R & D
- ⇒ ↑ Quantity of gd
- ⇒ ↑ D for workers, Employment & $W \uparrow$

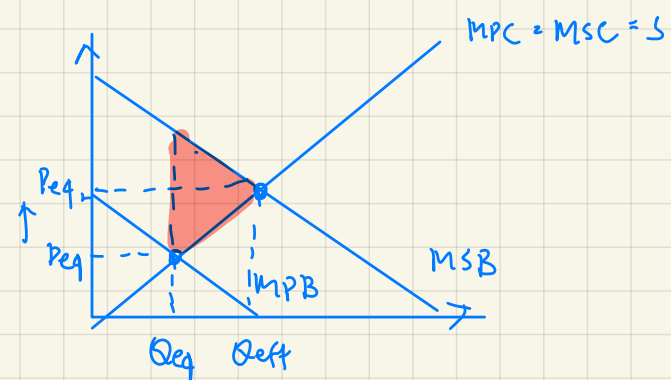
⑤ ↓ Income disparity

- ⇒ Both rich & poor face same amount of reduction
- ⇒ Price reduction accounts for more % of the income of the poor than the rich
- ⇒ poor benefit more
- ⇒ As the price of edu ↓, more affordable to the poor
- ⇒ Receive better edu
- ⇒ ↑ income in the future
- ⇒ But less affect the rich

Weakness

- ① Involve tech difficulties in the calculation of subsidy
 - ⇒ ∴ subjective tve con ext to different people
 - ⇒ Difficult to set a uniform subsidy
 - ⇒ Too high is the subsidy ⇒ over-provided
 - ⇒ Too low is the subsidy ⇒ Ineff to ↑ Q_m
 - ⇒ Time-consuming to set the subsidy ↑ Q_m
- ② Ineffective to ↑ Q_e under price inelastic D
 - ⇒ If D good is price inelastic D
 - ⇒ S shifts downward ⇒ $P_{eq} \downarrow$
 - ⇒ $P \downarrow$ leads to less than proportional of ↑ Q_m
 - ⇒ $Q_m \uparrow$ a little
 - ⇒ Not effective to ↑ Q_m to Q_{eff}
- ③ Expensive to ↑ subsidy
 - ⇒ subsidy: Area P_pDCP_{eq}
 - ⇒ ↑ financial burden of the gov
 - (O.C = giving up the \$ for infrastructure or health-c)
 - ⇒ may ↑ tax to finance the subsidy
 - ⇒ ↓ disposable income of households
 - ⇒ ↓ L-S

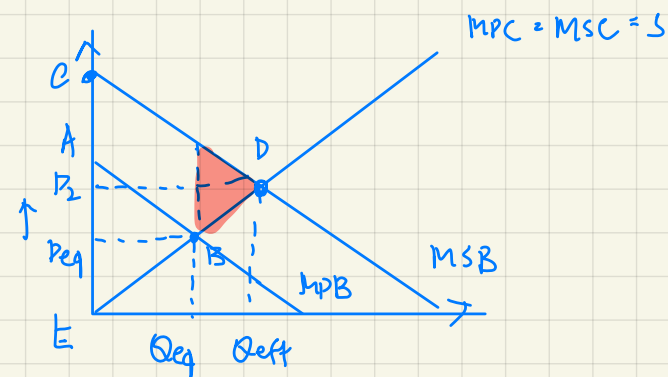
b) gov regulation



- ⇒ e.g. HK compulsory edu is set by the gov
- ⇒ Demand ↑ from D_1 to D_2
- ⇒ P_m ↑ from P_{eq} to P_{eq2} & Q_m ↑ from Q_{eq} to Q_{eff}
- ⇒ At Q_{eff} , $MSB = MSC$
- ⇒ No DWL, m-f
- ⇒ Eff

Strength

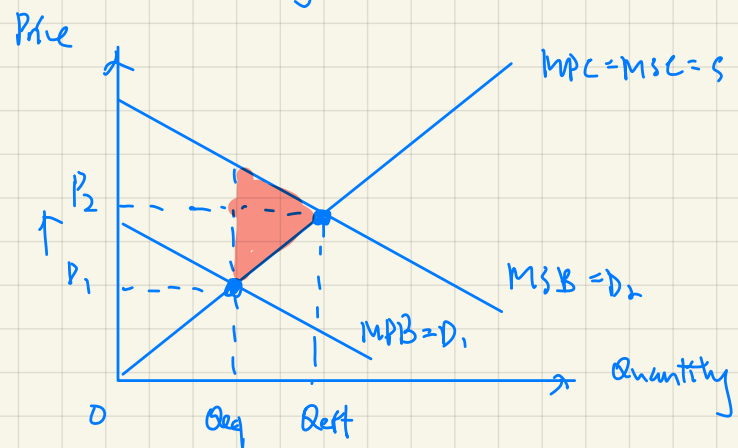
- ① Effective to ↑ Q_m even under P inelastic D
 - ⇒ gov law or order, everyone has to follow
 - ⇒ D ↑, Q_e ↑ not through ↓ P_m
 - ⇒ Eff
- ② No tech difficulties
 - ⇒ No need to calculate E.C to set tax, permit
 - ⇒ ↓ time & cost
 - ⇒ ↑ Effectiveness of ↓ Q_{eq}
- ③ C.S ↑, P ↑ to P_2 & Q ↑ to Q_{eff} , CS ↑ Area ABP_1 to Area CDP_2
P.S ↑
- ④ ↓ gov financial burden
 - ⇒ no need to spend on subsidy to schools for ↑ Q_m
 - ⇒ save the \$ for other activities, Edu & HC
 - ⇒ L.S ↑



Weakness

- ① Time-consuming on setting the regulation
 - ⇒ consider the effects to various stakeholders (political constraints)
 - ⇒ complicated administration procedures (meeting & discussions)
- ② ↑ monitoring cost to prevent people violating
 - ⇒ set up department
 - ⇒ recruit people to monitoring
 - ⇒ ↑ cost
- ③ P_m ↑
 - ⇒ Income disparity
 - ⇒ Poor & rich pay the same ↑P
 - ⇒ Rich pays lower % of their income as the P ↑
 - ⇒ Income ↑, tax rate ↓

1c) Advertising, promoting



- ⇒ $P \uparrow$ from D_1 to D_2
- ⇒ $P_m \uparrow$ from P_1 to P_2 & $Q_m \uparrow$ from Q_{eq} to Q_{eff}
- ⇒ At Q_{eff} , $MSB = MSC$
- ⇒ No DWL
- ⇒ No misf.

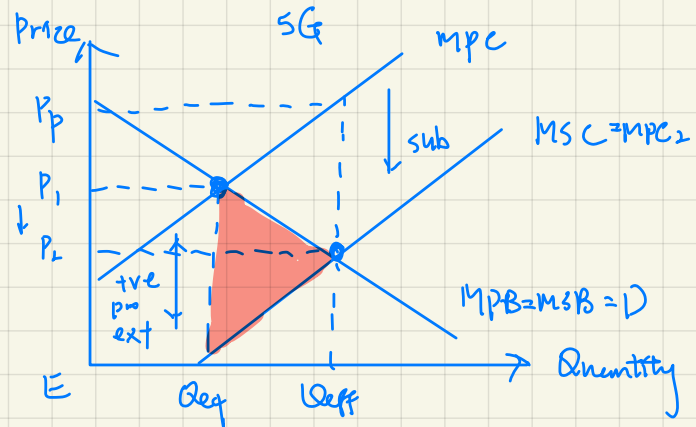
Strength

- ① Effective to $\uparrow Q_m$ even under price inelastic \downarrow
 - ⇒ receive information, new knowledge
 - ⇒ Δ belief, habit in long term
 - ⇒ Effective
- ② No tech difficulties
 - ⇒ No need to calculate E.C to set tax, permit
 - ⇒ \downarrow time & cost
 - ⇒ \uparrow Effectiveness of $\downarrow Q_{eq}$
- ③ C.S \uparrow , $P \uparrow$ to P_2 & $Q \uparrow$ to Q_{eff} , CS \uparrow Area ABP_1 to Area CDP_2
P.S \uparrow

Weakness

- ① Long time for the effective
 - ⇒ need time to Δ belief via education, let msg to reach people
 - ⇒ Time-consuming to $\uparrow Q_m$
- ② Income disparity
 - ⇒ Poor & rich pay the same $\uparrow P$
 - ⇒ Rich pays lower % of their income as the $P \uparrow$
 - ⇒ Income \uparrow , tax rate \downarrow
- ③ Expense in doing promotion

2) +ve pro ext



a) **subsidy to firms**

- ⇒ pro. cost ↓
- ⇒ +ve pro ext is internalised to be the benefit to the firms through ↓ in MPC
- ⇒ if sub = +ve pro ext
- ⇒ MPC shifts down to MSC
- ⇒ P_m ↓ from P_1 to P_2
- ⇒ ↑ incentive to ↑ Q_m from Q_{eq} to Q_{eff}
- ⇒ At Q_{eff} , $M_{LB} = MSC$

b) Advantage

① ⇒ ∴ Market-based policy

- ⇒ ↓ P_m fast due to the subsidy
- ⇒ create incentive for consumers to ↑ Q_c
- ⇒ Q_m ↑ to Q_{eff}

⇒ Immediate impact

② C-S : P_c ↓ P_1 to P_2 , Q_c ↑ Q_e to Q_{eff}

⇒ Area CDP_1 to CBP_2

P.S : P_p ↑ P_1 to P_p , Q_p ↑ Q_e to Q_{eff}

⇒ TR ↑, Area P_1DE to P_pAE

③ ↓ income disparity

- ⇒ poor & rich face the same amount of p ↓
- ⇒ rich benefit less % in terms of their income than the poor

④ ↓ monitoring cost

- ⇒ no need gov to monitor the operation
- ⇒ save cost to spend on edu & health
- ⇒ ↑ L-S

Weakness

① Ineffective to ↑ Q_m under price inelastic D

- ⇒ subsidy, S shifts ↓
- ⇒ P_m ↓ leads to less than proportional ↑ in Q_m
- ⇒ ↑ Q_m a little
- ⇒ Not effective to ↑ Q_m

② ↑ financial burden for gov

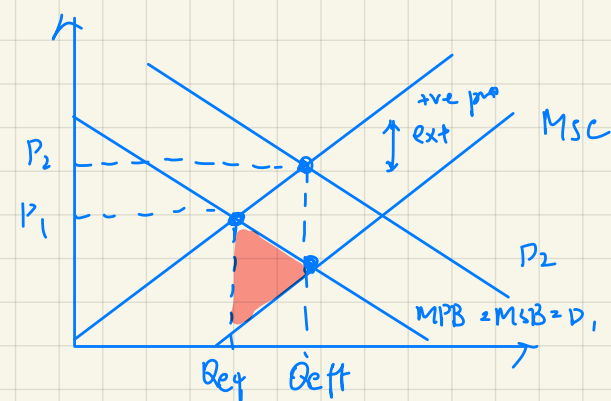
- ⇒ Expense on subsidy (Area P_pP_2AB)
- ⇒ may need to ↑ tax
- ⇒ harm the tax payers
- ⇒ give up \$ that spend on edu & health-care
- ⇒ ↓ L-S, ↑ financial burden

③ Tech difficulties in calculating sub

- ⇒ In order to effectively ↑ Q_m
- ⇒ set sub = +ve pro ext
- ⇒ +ve pro ext is subjective
- ⇒ difficult to find out the value of +ve pro ext
- ⇒ not easy to set
- ⇒ Too high : overproduction, too low : ineffective to ↑ Q_m

d) Gov regulation

⇒ e.g. gov requires many households or firms to adapt the SG



⇒ $D \uparrow$ from D_1 to D_2

⇒ $P_m \uparrow P_1$ to P_2 & $Q_m \uparrow Q_m$ to Q_{eff}

⇒ At Q_{eff} , $MSB = MSC$

⇒ No DWL, Eff, no m.f.

Advantage

① Effective to $\uparrow Q_{eq}$ to Q_{eff} even under price inelastic D

⇒ Everyone has to follow

⇒ otherwise will be punished

⇒ $D \uparrow$, $Q_{eq} \uparrow$

⇒ not $\uparrow P$ to $\downarrow Q_m$

⇒ Effective to $\uparrow Q_m$ even under price inelastic D

② No tech difficulties

⇒ No need to calculate subsidy

⇒ save time & \$

⇒ \uparrow effectiveness to $\uparrow Q_m$

③ \downarrow financial burden compared with subsidy

⇒ no need to subsidise the firms

⇒ save the \$ for edu, healthcare

⇒ $\uparrow L-S$

Weakness

① Time-consuming under political constraints & administrative process

⇒ gov sets the regulation

⇒ hv to go through long process

⇒ need to consider various stakeholders

⇒ Time consuming to $\uparrow Q_m$

② \uparrow monitoring cost

⇒ Recruit someone to monitor the situation see if they follow

⇒ expense

⇒ give up \$ on edu & health care

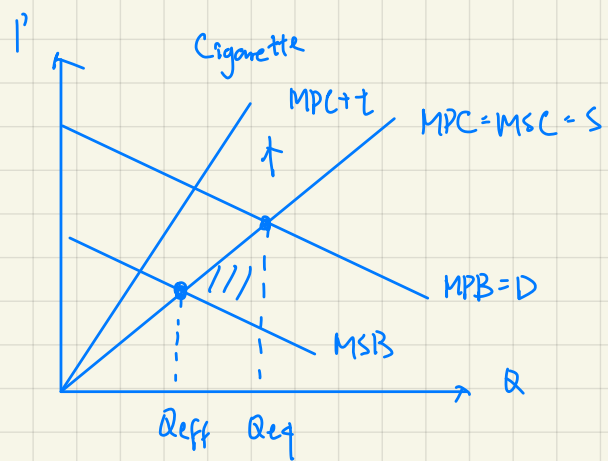
⇒ $\downarrow L-S$

③ \uparrow income disparity

⇒ Rich & poor face the same $p \uparrow$

Negative consumption externality

Solutions of -ve an ext



a) Tax: market-based policies

- ⇒ Tax on the spendings of gds & services
- ⇒ e.g. (67% of P cigarette)
- ⇒ ↑ pro cost of firms, ↑ MPC
- ⇒ Supply / mpc shifts upward to $MPC+t$
- ⇒ P_{eq} ↑ from P_{eq1} to P_{eq2} , Q_{eq} ↓ from Q_{eq1} to Q_{eq2}
- ⇒ At Q_{eq2} , no DWL
- ⇒ $MSB=MSC$
- ⇒ Left ✓

Strength

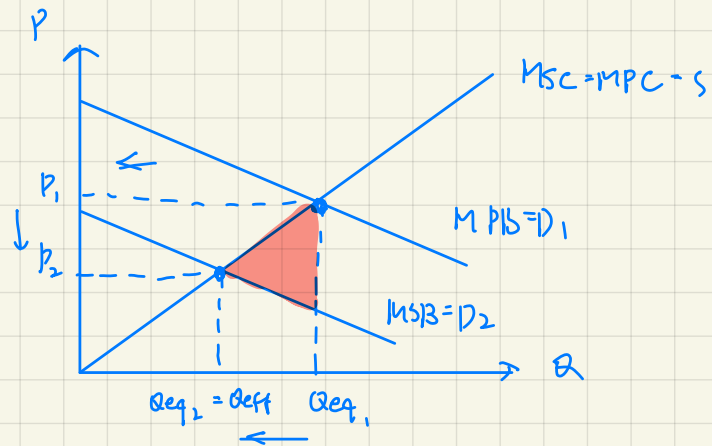
- ① Tax revenue ↑
 - ⇒ Tax ↑ Exp on edu
 - ⇒ ↓ D of cigarette
 - ⇒ more effective to further ↓ Q_{eq}
- ② Immediate impacts without much administrative system v.s gov regulation
 - ⇒ ∴ Market-based policy
 - ⇒ Tax ✓ ⇒ P_m ↑ fact
 - ⇒ Consumer respond to the signal sent out by ↑ P_s
 - ⇒ Q_m ↓ or Q_d ↓ without political concentration & time consuming administrative process in gov regulation
 - ⇒ fast to ↓ M.F

Weakness

- ① Ineffective to reduce Q_m under price inelastic D
 - ⇒ E.C is internalised to be the MPC by the tax
 - ⇒ $P_{m,gd}$ ↑, leads to less than proportional ↓ in Q_m
 - ⇒ Q_m ↓ little
- ② Tech difficulties
 - ⇒ time consuming to calculate & ↑ Q_m
 - ⇒ Aim: tax = -ve pro ext ⇒ Q_m → Q_{eff}
 - ⇒ -ve pro ext is subjective to diff ppl
 - ⇒ Diff to quantify & identify who suffer -ve pro ext

b) Gov regulation

⇒ Ban the purchase of cigarette below 18 ym old



⇒ $D \downarrow$ from D_1 to D_2

⇒ $P_m \downarrow$ from P_1 to P_2 & $Q_m \downarrow$ from

Q_{eq1} to Q_{eq2}

⇒ At Q_{eq2} , no DWL

⇒ $MSB = MSC$

⇒ Eff ✓

Strength

① No tech difficulties

⇒ No need to calculate E.C to set tax, permit

⇒ \downarrow time & cost

⇒ \uparrow Effectiveness of $\downarrow Q_{eq}$

② Effective in $\downarrow Q_m$ regardless of PED

⇒ order from gov must follow

⇒ $\therefore D \downarrow$; not $\uparrow P$ to $\downarrow Q_{eq}$

⇒ Effective to $\downarrow Q_{eq}$ even under price inelastic D

Weakness

① No tax revenue & \uparrow cost on monitoring policies

⇒ \uparrow financial burden of the gov

⇒ No money to \uparrow edu, promotion to further $\downarrow D$ of demerit gd

⇒ less effective to $\downarrow Q_m$

② Time consuming to set the gov regulation

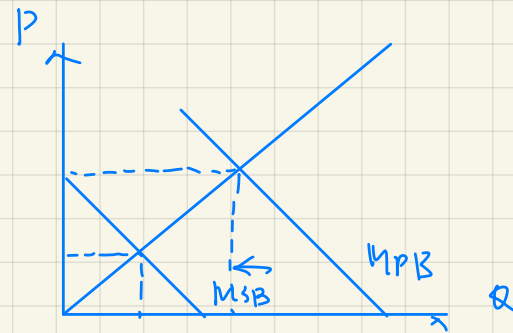
⇒ goes through a lot of administrative procedures

⇒ hold meeting to strike a good balance between various stakeholders involving political constraints

⇒ Not effective to $\downarrow Q_m$ in a short time

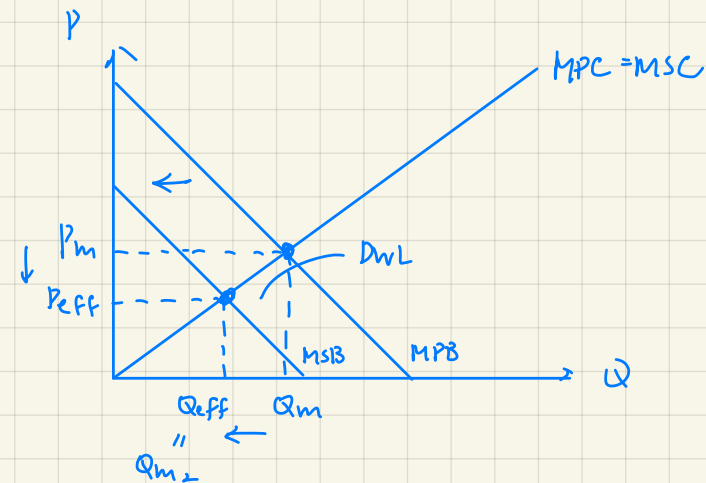
③ Consumer lose : CS \downarrow

Producer lose : P.S \downarrow



3) Advertising education

- ⇒ gov spends on adv. & edu. on harmful effect of the demerit good
- ⇒ $D \downarrow$ from D_1 to D_2
- ⇒ P_m & $Q_m \downarrow$, $Q_m \downarrow$ to Q_{eff}
- ⇒ At Q_m , $MSB = MSC$
- ⇒ No DWL
- ⇒ eff ✓



Weakness

1. No tax revenue
 - ⇒ ↑ financial burden of the gov
 - ⇒ No money to ↑ edu, promotion to further ↓ D of demerit gd
 - ⇒ less effective to ↓ Q_m
2. Not immediate impact:
 - ⇒ need time to educate, change habit, transmit info. to people
3. Consumer lose
Producer lose

Strength

1. Effective to ↓ Q_m even under price inelastic D
 - ⇒ info. is well received
 - ⇒ long term habit change
 - ⇒ $XP \uparrow \Rightarrow \downarrow Q_m$, but $D \downarrow$ directly without referring to PED
2. No tech difficulties
 - ⇒ No need to calculate E.C to set tax, permit
 - ⇒ ↓ time & cost
 - ⇒ ↑ Effectiveness of ↓ Q_{eq}